Production ship has systems for extracting electricity from regenerative energies, electrolysis system for extracting hydrogen, desalination device, equipment for obtaining materials from seabed, etc.

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Inventor: SCHOPF WALTER (DE)
Applicant: SCHOPF WALTER (DE)
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Abstract of **DE10219083**

The ship is essentially a sea-going floating body similar to a conventional ship with manufacturing and/or process technology equipment for processing, improving or converting raw materials or producing fuels and propulsion machines. It has systems for extracting electricity from regenerative energies, an electrolysis system, a desalination device, equipment for obtaining/delivering materials from/to the seabed and on-board storage space. The ship consists essentially of a sea-going floating body (1) similar to a conventional ship fitted with manufacturing equipment and/or process technology equipment for processing improving or converting raw materials or producing fuels and with propulsion machines. It has on-board systems (4,7) for extracting electricity from regenerative energies, an electrolysis system for extracting hydrogen, a desalination device, equipment for obtaining materials from the seabed and for delivering materials to the seabed for disposal or laying and on-board storage space for materials.

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The invention concerns a production ship with the characteristics indicated in the generic term of the patent claim 1.

(E) intensive development and intensified employment of regenerativ energies is and remains a requirement of mankind history global recognized. This, although since first energy Verknappungsscenarien (z. B. by club OF Rome) new, still longer sufficient energy reserves discovers and z. T. were already opened, but considering

- a obligating Sicherstellung and receipt of vital substances in raw materials high-energy for future generations,
- the use of the disputed nuclear energy limited in the future,
- an essential CO2-Produktionsverminderung (to at receipt of the climate and thus our living conditions),
- as well as the power requirement, in particular in swelling and developing countries, increasing world-wide, whereby in such zones a proportionately high power requirement for the dressing and Sicherstellung of vital substances such as z. B. Drinking water is necessary.

Under regenerativ energy resources developable the available and the wind energy favored itself (the hydroelectric power potentials are already in Europe to a large extent opened and thus exhausted). Extensive wind-powered device projects were already developed and realized in an not expected extent.

For an economic use of the wind energy lie geographical conditions offer different conditions. Like that the wind intensity is most favorable concerning strength and continuity in coastal regions. Furthermore the ?roughness burr? a region affects itself strongly (n) a elevatordependent wind dispersal and - accumulation out (z. B. after ?light man exponents?), whereby coastal regions are likewise bevorteiligt. Beyond that come for the acceptance and feasibility of a wind-powered device or one - parks still more worth aspects such as noise immission, shade throw, optical compatibility and above all also nature and aspects of landscape protection to carrying. Under consideration of these different criteria coastal regions for the plant of wind parks predestined themselves. Acceptable inland locations (at least in Germany) are to a large extent opened and/or. no longer available. Since also coastal regions are in this connection already to a large extent opened, also arguments of the landscape protection frequently against it speak, place themselves inevitably with manufacturers and operators of wind-powered devices and/or. Power suppliers the trend to offshore wind-powered devices. Except a increased intensity and continuity of the wind on high lake is also the elevator influence on the wind dispersal smaller. With lower hub heights thus already more efficient yields can be obtained. Furthermore the higher Geräuschimisionserträglichkeit permits higher high-speed run numbers of revolutions, which is able to increase the efficiency of a WKA again.

Some unfavorable facts and facts are present nevertheless also in the offshore use:

- more expensive establishments and buildings of towers,
- the nature protection in Watt and shelf areas contrary-current facts

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- Water bird reservations near the coast,
- Bird airlines near the coast
- Noise and thus breakdown loads of Meeresgetier, in particular the sea mammals with their sensitive and its detection serving aural acuity,

- problematic net binding, how

- fundamentally new channels and reticulated systems to be created must, besides still with possibly. polluting route guidance in the bottom of the sea,
- particularly these reticulated systems the characteristics of the wind power generation to become fair to have (in particular with ?net-led? plants, which presupposes a strong group);
- Lines by the navigation are endangered.

Under consideration and consideration of such aspects the implemented and planned offshore of wind power stations is to a large extent near the coast put on. Actually it concerns therefore thereby more ?Onshore? - wind power stations. WKA locations in shallow waters with favorable establishment conditions, or small nature protection editions and without endangerment that or by the navigation are not also only limited available.

As the further under regenerativ energy resources developable the available and is the solar radiation. She saves Energiepotenziale, which exceed all other energy resources in a not conceivable way. Unfortunately it is so far only meageriy opened. Bad efficiencies and high production costs of the solar modules is very hinderlich its use. In our

regions the high space requirement is a negative criterion even with larger plants for mains supply. Actively operated the efforts for development and research, z leave nevertheless. B. expect progress in the areas of the ?thin-film technology?, user-friendly.

Task and a goal of available invention article are,

a) To create wind energy plant conceptions, which are suitable, on high lake besides still higher and more effective wind accumulation under large avoidance of the aforementioned negative aspects for that quasi ?Onshore? - wind-powered devices for the generation of current to open,
b) to create likewise Photovoltaikanlage conceptions, which open usable spaces occupied;
c) to use the river of both sources of producer produced thereby in an efficient and economic way ?locally?,
d) the won energies into (so far) a rare, future-relevant source of energy, the hydrogen, to convert low-loss,
to begin or to the Göwinnung the vital raw material drinking water rare for some regions,
e) to find economical solutions to open and locally use fossil and mineral raw materials for the hydrogen production,
f) economical solutions for storage and transport or of the improved materials, as well as for the disposal of the harmful by-products, produced on board, in particular CO2, resulting thereby, to find.

The solution of the tasks mentioned is obtained by in the requirements and in the remark examples of stated remark characteristics according to invention.

The advantages attainable thereby consist essentially of the fact that

- efficient wind-powered device locations to be used know,
- the produced river without intermediate losses production processes is supplied to a large extent;
- by favourable training and arrangement of wind power machines and solar modules on the one hand a large active Photovoltaik surface gesschaffen becomes, on the other hand these plants is space saving retractable, so that the ship is suitable for transportation purposes also,
- the employment of the ship according to invention also on more schwingungsgefährteter is made possible ?high lake?,
- Raw materials rationally by the bottom of the sea promoted and on board uses,
- Pollutants to be disposed know,
- repeated anchoring and coupling are facilitated.

Details of individual favourable remark characteristics result - are there discussed or - from the descriptions of remark example.

Further for the state of the art over the employment and utilization areas of the wind stream with recognizable existing disadvantages, included in the invention article:

To the hydrogen production

Solutions for the economic production from hydrogen to the covering of its extensive need in the future power supply are of essential importance. Hydrogen represents a favourable alternative to conventional exhaustible fuels of fossil origin as source of energy to the operation of pollution free Verbrennungsmaschihen. Above all however as an energy supplier for the promising and pollution free gas cell, which both when pollution free current and and heat supplier be used can. Hydrogen in pure form is suited for the operation of gas cells in the mobile drive.

With all the euphorically feelable, the hydrogen which can be attributed attributes it is not to be misjudged that to its production (with popular large-scale installation procedures) usually energy must be invested. This dominance electricity (form) cannot be produced also always pollution free, except one uses the disputed atomic current in addition, its production however also secondary problems (disposal) or worse event possibilities saves. In addition any (r) energy conversion and energy transfer are - z. B. in the energy chain with the production of an usually net-faithful and tension-stable river, with its transformations and line losses and the folglichen with the H2-Gewinnung procedure-fair shaping and/or. Rectification connected with losses and technical expenditure. Like that it is well-known that for the energy contained in the hydrogen about the doppehe energy quantity must be made available for its production! Thus (apparently) the unsurpassed efficiency of the undisputed pollution free gas cell is only the half truth. For the realization of a future-oriented pollutant-free, at least low-pollution Energieversorgungscenariums on hydrogen and in particular on gas cell basis one is economical and umweltfteundliche H2-Gewinnung a condition.

An important goal is managing therefore, that under C) and D) stating and as soon as a further to save or at least reduce usually the river - data communication equipment and - of losses unusually complex with conventional offshore wind-powered devices.

To the seawater desalination

Although our earth's surface is covered with water to approx. 2/3, about 1/3 of mankind are available directly no drinking water. This z. T. due to the natural conditions (drying regions), but particularly by the civilization caused interferences (industry, tourism, population growth, land exploitation by agriculture with also contaminating otherwise caused thereby more connected or or bacterial contamination). Already today many regions are dependent on the production by drinking water from sea water. This requirement will particularly strengthen with the increasing population and the increasing standard of living in the development and developing countries still.

A further objective of the invention thought is therefore a solution identification for the transport of the won drinking water into in this connection needy regions.

To the raw material supply, disposal and transportation problem

For hydrogen production from fossil raw materials that is offered so far in this connection relatively little used, z. Z. still plentifully existing natural gas on. Its ?ignoring? lies probably in cost-intensive opening and transporting justified,

particularly since extensive stores lie in the sea range. Also for current, an obvious hydrogen production from wasserstoffhaltigen connections, become, like z. B. the ?pyrolysis procedure? with electronic torch, with which electricity is needed, might by their lack and/or. their costs usually a realization been hinderlich its. A negative aspect during the hydrogen production from fossil sources of energy is also the accumulation of CO2, whereby the umwehfreundliche H2-Einsatz desired is led ad absurdum.

Therefore comes both the development. and/or. Use of Erdgasvorkommen as nearby as possible at consumers and/or. turned around, and the disposal of the HO2 likewise special meaning resulting during the hydrogen production too.

A promising and promising source of raw material for hydrogen is in tuber form at the bottom of the sea storing methane hydrate. This so far little well-known source of energy (methane) of very high power density stores however in deep sea-bottoms, however among experts as an almost inexhaustible energy source is regarded. At it it is unfavorable that it is surely due to its very high methane content a large greenhouse gas producer. Also among competent experts (in completely the stage not investigated yet) doubts are going by expressed that at sudden temperatures and pressure changes of this material suddenly methane could become free like an explosion. For such events of larger extent already taken place there is to already be visible references at the bottom of the sea within the range of such stores. Therefore attention must be given to these possible dangers with dei digging and processing of this raw material.

Further secondary goals of the invention thought are to be found therefore procedures and mechanisms or created for an economic digging of such raw materials with consideration of its possible Gefahrenpotenziale, to which - the solution anticipating - off on high lake can be best corresponded fem by living and industrial areas.

The registration article is described below under reference to designs. For this shows:

Fig. 1 the front view according to invention out-arranged of a production ship with a wind power machine at deck and an extendable stage plant in the driven out condition, serving as carriers of a Photovoltaikanlage;

Fig. 2 the one side view of a section of the ship in accordance with Fig. 1 with a sectional view one stylizes represented driving out mechanism for the stage plant as well as a mechanism for turning the tower of the wind power machine;

Fig. 3 the other side view of a section of the ship in accordance with Fig. 1 likewise with a sectional view stylizes represented driving out mechanism for the stage plant, as well as a retractable tower execution;

Fig. 4 the Schiffsprofil in the front view with brought in stage plant, as well as an included switching and supplying pattern for a side supporting and an oscillation damping mechanism.

Fig. 5 a schematic representation of the necessary different ship positions to their point of anchorage as a function of wind direction and sun irradiating direction during a solar module arrangement in accordance with Fig. 1;

Fig. 6 one hydraulically/pneumatic wind power machine tower - condition basis also in their height of variable supporting and stroke elements.

Fig. 7 an anchorage basis at the bottom of the sea for according to invention out-arranged a production ship, with integrated tapping and transition regions for tubing systems for promoting from that or of the bottom of the sea won raw materials, or for the disposal of environmentalharmful materials, or for storage on board won substances, preferably hydrogen.

To Fig. 1 to 4

The hull 1 carries a tower 2 with the car 3 with their usual mechanisms such as hub storage, generator, brake, control equipments ect. and the wind power machine 4.

Furthermore it carries one stage plant extendable after both ship sides, preferentially from two to a large extent symmetrical constructions the 5 and 6 insists and on the top side for arranged solar modules 7,27. These are on lengthwise arranged to the hull 1 running rotable waves 8 tiltably. The stage halves of 5 and 6 are tiltable stored, so at the hull by means of the stores bases 9 and 10 that they take one in the employment the sun course-bent skew. To the support that far stages 5 and 6 auskragenden, in addition, to stabilization during lateral wind admission are arranged at their ends in the water dipping, preferably submerging flotation chambers 11 and 12 in particular.

On board produced river is mainly to the electrolytic hydrogen production as well as certain to the seawater desalination except operating equipment usual for the supply. For this the hull 1 is equipped with appropriate process engineering mechanisms. Furthermore it points for storage, and/or. Storage, or and/or. and for the transport of raw materials or and won substances of camp and tank compartments produced on board up.

A substantial favorable aspect for the employment of the Photovoltaik for aforementioned Zeck is that the direct current without otherwise loss and spend-afflicted, won thereby, can be used rectifying action for these procedure processes.

Since the efficiency of the solar modules is affected generally very strongly by the angle of incidence of the sunbeams, an optimal right-angled position is to the sun an essential demand. A practical possibility for it to actual in some (usually research) projects is already practiced - each individual solar module fourwheel swivelling of storing and the sun of adjusting. This requires however a high constructional and financial expenditure. Above all however such solutions for the rough aggressive offshore use are not at least hardly acceptable, or. That simplicity-half therefore the solar modules 7.27 at the waves 8 to a large extent paralell running to the hull are arranged, which except the possibility of the inclination variation still another space saving ?folding? (S. Fig. 4) the solar modules makes possible. The horizontal correct attitude to the sun is caused by an appropriate ship position. For this Fig leaves. 5 recognize that when anchorage in the bottom of the sea the anchor binding at the ship must take place depending upon wind direction and time of day-dependent position of the sun very differently, in the complete circle around the ship. In order to become fair these requirements, the hull 1 exhibits a circulating attachment basis for a locally arbitrary binding of the rip line. It consists of a bar 13 with transverse pins 14, which fulfill Triebstockverzabnungsähnliche tasks. Against these toothed wheels 15, 16 rest on the inside, which are stored in a bügelförmigen mounting plate 17 for rip line strands 57, 58. A gear wheel 16 is propelled by an associated driving device 18 for horizontal positioning of this anchor attachment at the

hull. For the Sicherstellung differences of a stability of the ship during lateral incident-flow direction are two such mechanisms intended, of them together supplementing functions from the description of the Fig. 5 come out.

From constructional and firmness criteria the solarmodule-basic stage 5, 6 of the ship length is divided after into sections. Between them and at the ends are the supporting and hinge points for the basic structures of the stages 5, 6. At a hull-firm supporting basis 21 joint and supporting tap 22 of a guidance cross beam 23 in the one platform 24 with on it arranged solar modules the 27 are are adjustably fixed. At this again a further guidance cross beam 25 is arranged, in which likewise a platform 26 with solar modules 27 is adjustably fixed. Mutual stage 5 is just as constituted.

The flotation chambers 11, 12 are by supports 28, 29 connected with joints 30.31 with the stage ends so that them also with Nichtbedarf with drawn in stage 5.6, z. B. while a transporting to the hull to be put on can.

For operatingless phases of the wind power machine such as z. B. with transporting, dangerous climatic conditions, or for repair purposes the tower 1 is put down and/or. drawn in. For this it sits in a hull-firm joint basis 32 or it consists alternatively of telescope-like into one another-sliding trunks 33, 34, 35, whereby the outside and the brought in reach up to the ship soil. In this connection it is also favourable to implement the wind power machine wings 36 fold upable.

In Fig. 4 is positioned the energy producers in resting position, like it z. B. Travel is appropriate. Those mainly the lateral stability of the entire plant increasing flotation chamber 11, 12 exhibit changeable mechanisms for increasing their lift and thus their supporting strength additionally in the volume, z. B. in the form of inflatable rubber bellows 19, 20. These are used by dynamic filling and emptying for oscillation damping (with oscillations around the ship longitudinal axis). This is particularly current considering during lateral wind incident flow of the ship by the effective relatively far above stagnation pressure at the wind power machine. For the controlling of these functions following two alternative mechanisms and procedures are intended:

1. A valve mechanism 37, in its function mode four of a ski selector valve, supplied of a compressed air receiver 38, which is filled of a compressor 39, supplies alternatively by way of this feeder lines 40.41 the rubber bellows 19, 20 compressed air. Depending upon placing command intensity of the valve mechanism 37 in reverse allocation the other one is balanced in each case over the exhaust lines 42, 42 and/or. emptied.
To the energy conservation with this cyclic filling connected with pressure build-up a special switching way comes to application. The exhaust lines 42, 43 are led to the intake 44 of the compressor 39, in which a back lying valve 45 sits. The compressor 39 is in its mechanical handling capacity adjustably implemented and in such a way steered that it entrance-laterally it the chambers of the rubber bellows 19, 20 understood in relaxation require a lower pressure level in-regulated, however still more highly lies than the atmospheric pressure. The saving exists in the mechanical handling capacity, which results from this difference of pressure and the Fördervolumen. , Or deliveries necessary only which can be supplemented for lifting the operating pressure level under standard conditions over back impact valve the 45 are in-sucked.
2. The pressure chambers of the rubber bellows 19, 20 are over the feeder line 46 by means of an interposed pump operable in both directions and/or. Compressor 47 connected, so that drive direction-dependently the rubber bellows 19, 20 are alternatively filled or emptied. The mechanical handling capacity results again only from the difference of pressure and the flow rate. (Middle) the pressure level of this system is determined by into the feeder lines the 46, 47 promoting, more rarely active compressor 49.

These mechanisms can be naturally also several times, also around a ship transverse axis 49-50 effective, arranged.

As the further, or alternative mechanism for oscillation damping use or additional tank compartments than (Frahm) antiroll tanks are trained.

To Fig. 5

The hull 53 is with the anchor basis 54 at the bottom of the sea over rip line 55, which changes into a junction 56 into two strands 57 and 58, over a connecting mechanism 59 in accordance with the pos, 15, 16, 17, 18, the Fig. 1 connected. It carries the wind power machine 60, as well as the stage stand 61, aligned after the respective wind direction, 62 with its by the dozen solar modules arranged on it. With this and the further, and/or. individual representations are arranged the points of anchor 54 on lines of uniform wind and sun irradiating direction in each case, from whose relations the ship position results.

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The representations show those requirement of a variable and steered binding of the ship to the anchorage basis, what is solved by the remarks according to invention of the positions 15, 16, 17 and 18.

To Fig. 6

Pos 75 stylizes a tower carrier, like z. B. under Fig. 2 described pos 5. On it an upper tower carrier basis 76 rests, on which the tower 1 of a wind power machine sits. Both are connected by means of hydraulic or pneumatic supporting and stroke elements 77, 78, 79.89.81. These are implemented in the available remark example as wide, flat rubber bellows. They make a preferably hydraulically caused swivelling possible of both Turmträgerbasen too each other in arbitrary directions.

With appropriately from Fig. 1 and 2 taken over tower seat and attachment characteristics must the free space 83 of the tower seat naturally corresponding swiveling liberties exhibit. In available remark example the supporting and pairs of stroke elements 78.81 form a drag axis X-X, the supporting and stroke elements 77.79/80 the axle Y-Y. Because of wind load 84 affecting on one side the tower the supporting and stroke elements are doubly located on the more highly loaded leeward side. Furthermore is for compensation possibly. arising lifting capacities at the luffing side a supporting and a stroke element 82 on the lower surface of the lower tower carrier cousin 75, working opposite, arranged. This causes downward directed toward the upper tower carrier basis 76 an influencing retaining strength, transferred by pressure plate 85 and, the lower tower mother board 75 free moving penetrating pair of connecting posts 86.

The supporting and stroke elements 77 and 79,90 form the swiveling basis of the Y-Y-axle. The active lagging around this axle causes the supporting and stroke elements 78 and 81. Their hydraulic supply is made by means of hydraulic pump 87 by a stop valve 88 (to holding a developed pressure level). For dosage to different application of pressure of these supporting and stroke elements, like that for the purpose of a tower inclination correction or for dynamic oscillation damping measures is inserted in their feeder line 89 a pump 90 promotable in both directions necessary-proves 78 and 81. A substantial advantage of this rule and pressure supplying conception is their small power demand. This, because not as frequently in usual hydraulics usually, full supporting pressures of a hydraulic cylinder applied and, but due to the application of pressure of the suction face with the counter-pressure of the other supporting and stroke element basis only (usually small) a difference of pressure must have to be overcome by the pressure producer be developed.

The movements around the Y-Y-axle are essentially caused on same way with same elements. For the argument supply and pressure maintenance a hydraulic pump and a stop valve 92 serve 91, for applying the differential pressure a pump 94 promotable arranged in the feeder line 93 in both directions. Additionally for the alternative employment moving in opposite directions working of the supporting and stroke elements a switching element is arranged 77 and 82, which switches the upper supporting and stroke element 77 actively alternatively into position 95a, whereby the lower supporting and stroke element 82 by exhaust line 96 with an argument reservoir 97 are connected. During the alternative switching position 95b the connections turned around. Furthermore a logic element 98 is arranged for and switching the second supporting and stroke element 80 off.

The hydraulic switching and supplying elements are steered from one microprozessor steered steering wheels and controlling mean including sensor technology necessary for it after a pre-determined mode. Beside tower inclination corrections for the favorable emphasis positioning of the wind power machine 2/3/4 with tower this mechanism is intended also for oscillation damping, in which tower with the wind power machine and the swimming wind-powered device carrier (the ship with its other superstructures) treat as a two-mass system, whose emphasis with appropriate vector directions is moved to each other and/or changed.

To Fig. 7

The anchor basis consists of a solid axle 101, those in a concrete socle 102 embedded, arranged perpendicularly in the bottom of the sea 100, also depending upon condition of the bottom of the sea appropriate, preferentially diagonally thereby firmly connected foundation piles 103. At the upper final range over the bottom of the sea it exhibits a circulating groove 104, into rotable, firmly therein arritierte retaining mechanism 105 for to it fastened, prominent rip line 106 sits diagonally upward.

In the equipment according to invention of the production ship for the production of hydrogen also the development and promotion of the H2-Trägers natural gas from fields are included in the bottom of the sea.

But it becomes to a large extent over and/or. in the proximity of the Erdgasvorkommens on lake positions and/or. embodied and connected by tubing or hose transport equipment 106 with collecting lines 108 of the gas field. The anchor basis of the ship exhibits also mechanisms for the delivery and transmission of the natural gas to the transport equipment of the ship, particularly with consideration of the circumstance that the transport devices (pipes) can advance 107 from different directions changing with the wind direction or circle even the anchor basis. For this attached data communication equipment 108 swivelling in horizontal level is, consisting of a turning basis located on the axle 101 109 with cross holes 110 to a cavity 111 over shutoff device 112 with the collecting line of the 113 of a gas field in connection stands, as well as from the turning basis 109 sealing enclosing Übertragungselement 114 with a circular cavity 115 at the axle 101 above the rip line adjustment, which changes 116 to the transportation pipe leading upward 107 into a connecting tube.

Between these pipes a tubing joint 117 is arranged 116 and 107, and, if with it is used rigid tubing systems of the rip line 106 as carrying rope, several of such tubing joints are arranged in the transmission circuit to the ship. This as possibility of adaptation for the process of the rip line 106, its dip sagging after the ?funicular curve? - itself to a large extent traction power and/or. wind force-dependently adjusts.

Favourably with relatively heavy transportation pipe designs actual if the exculpatory own lift small actual in the tubing distance leading upward one or more flotation chambers to the tubing system to attach over by their lift the tensile loads in the transportation tubing system or and/or. to reduce and in the rip line functioning as carrying rope.

Those managing described, into which anchor basis mechanisms integrated for the effectuation of a transport of goods between the bottom of the sea and according to invention equipped the ship can naturally for other goods and substances are used or for it extended. A possibility for it exists in the arrangement of a second fitting to the ship, for which a second turning transducer 119 according to kind first at the axle 101 is arranged, whereby the resuming line 122 in a memory or - other system leads. Thus, or also with first and different further tasks are to be able to be solved:

CO2-Entsorgung

Since with the H2-Extraktion from fossil raw materials also environmentalharmful CO2 becomes free, mechanisms are included to the CO2-Entsorgung into the Erfindungsgedanken. Is intended,

a) as far as this geophysical conditions are naturally present to pump CO2 to already empty or in sections by gas bearing places or other existing and for it suitable cavities in the bottom of the sea;
b) To leave CO2 the sea water. To this topic it is mentioned that already on natural dare a large part of the CO2 contained in the atmosphere by the sea water (over its surface) one absorbs. Is therefore obvious to enrich sea waters in one (presupposed compatible measures) with CO2 with future procedures increased - at least which concerns on-board CO2-Anfall available standing to the discussion -. These case could lead line 122 to an underwater plant activating the CO2-Absorbtion.
c) Storage of hydrogen in cavities in the bottom of the sea (possibly. empty natural gas chambers). Here is both at on

board according to invention equipped the ship from fossil raw materials the won, and by electrolysis produced hydrogen meant. The use appears one by the described anchor basis in connection with the natural gas use quasi (already) opened and/or. Bottom of the sea range particularly favorably. In addition, the possibility that the H2-Produktion (prefers by means of electrolysis) can be placed ?locally? over a suitable memory place, is surely an economic aspect.

Reference symbol list

Fig. 1 to 4
1 hull
2 tower
3 car
4 wind power machine
5, 6 stage
7 solar module
8 waves
9, 10 camp cousin
11, 12 flotation chambers
13 bar
14 transverse pins
15, 16 gear wheel
17 mounting plate
18 driving device
19, 20 rubber bellows
21 supporting basis
22 supporting taps
23 guidance cross beam
24 platform
25 guidance cross beam
26 platform
27 solar module
28, 29 support
30.31 joint
32 tower joint basis
33-35 telescope tower element
36 wind power machine wings
37 hydraulic. o. pneumatic. Logic element
38 Druckluüspeicher
39 pump/compressor
40, 41 feeder line
42, 43 exhaust line
44 intake
45 check valve
46, 47 feeder line
48 pump/compressor reversibly
49 pump o. Compressor

Fig. 5
53 hulls
54 anchor basis
55 rip line
56 junction
57, 58 rip line strand
59 connecting mechanism
60 wind power machine
61, 62 stage stand
63 line of the wind direction from east
64 line of the wind direction from south
65 line of the wind direction from west
66 line of the wind direction from north
67 line of the sun irradiating direction east
68 line of the sun irradiating direction south
69 line of the sun irradiating direction west

Fig. 6
75 tower carrier basis lower
76 tower carrier basis upper
77-82 supporting and stroke element
83 free space
84 wind force resulting
85 pressure plate
86 connecting post
87 hydraulic pump
88 stop valve
89 feeder line
90 pump o. Compressor reversible (r)
91 pump o. Compressor

92 stop valve
93 feeder line
94 pump o. Compressor reversible (r)
95 switching element
96 exhaust line
97 argument reservoir
98 connecting element

Fig. 7
100 bottom of the sea
101 concrete socles
102 axle
103 foundation pile
104 groove circulating
105 retaining mechanism
106 rip line
107 transportation pipe
108, 109 turning transducers
110 turning basis
111 cross hole
112 cavity
113 shutoff device
114 transmission basis
115 cavity more circularly
116 connecting tube
117 tubing joint
118 transportation pipe
119 Zwischenrohr
120 line 120
121 shutoff device
122, 123 line to memory or - other systems

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Claims of DE10219083	Print	Copy	Contact Us	Close

Result Page

1. Production ship, essentially consisting of a seaworthy flotation chamber according to kind of well-known ships, equipped with production facilities or and/or. and process engineering mechanisms for processing, improving or converting from raw materials or to the production of fuels, equipped with drive engines to its swimming progressive movement, by the fact characterized that
Plants for power generation from regenerativ energies,
an electrolysis plant for the production of hydrogen,
a mechanism for seawater desalination,
on board is arranged,
whereby operating equipment onboard on board produced river except the supply for the procedure processes one uses, it furthermore mechanisms exhibit or it assigned and so out-arranged are that they are suitable to promote raw materials of the bottom of the sea on board or and/or. to carry and also materials from board to the bottom of the sea for disposal or storage,
it tank and stockrooms for the admission on board promoted, improved or produced substances exhibits.

2. Production ship, according to requirement 1, by the fact characterized that the plant consists for power generation of a wind force energy installation.

3. Production ship, according to requirement 1 and 2, by the fact characterized that the wind-powered device consists to a large extent of tower (2) with a swivelling car (3) with a converter (4) and a generator, propelled arranged in cover center of a hull (1), arranged on it, by it.

4. Production ship, according to requirement 1 and 2, by the fact characterized that beside one cover center arranged converter lengthwise-laterally of it, to a large extent at the ship ends, additional lower positioned wind power machines are arranged to a large extent.

5. Production ship, according to requirement 1 to 4, by the fact characterized that the additional wind power machines are Darrieus rotors.

6. Production ship, according to requirement 1, 2, 4 and 5, by the fact characterized that the additional Darrieus rotors with vertical axis of rotation are stored in a stores basis, which is equally designed as generator.

7. Production ship, according to requirement 1 and 3, by the fact characterized that the additional wind power machine is a converter (125), located on a low tower (129).

8. Production ship, according to requirement 1, by the fact characterized that the plant is for power generation a Photovoltaik plant.

9. Production ship, according to requirement 1 and 8, by the fact characterized that as carrier basis for the Photovoltaik plant the entire ship top side taking off, extendable and around the ship longitudinal axis tiltable stage (5, 6) is arranged to a large extent.

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10. Production ship, according to requirement 1, 8 and 9, by the fact characterized that this stage consists of several specializedful parts, which are telescope-like in and to each other joined and separatable implemented, whereby them are implemented the ship length after in two, per one a ship side assigned stage halves (5 and 6).

11. Production ship, according to requirement 1 and 8, by the fact characterized that the solar modules (7, 27) of the Photovoltaik plant on the stage (5, 6) on plates tiltable arranged at lengthwise-stored waves (8) (7, 27) are appropriate.

12. Production ship, according to requirement 1 and 8 to 10, by the fact characterized that the stage halves (5 and 6) in such a manner exhibit a building method with a slewing mechanism (9, 10.11, 22), as well as a telescope-like shifting mechanism (2-25) that they both as far as be separated can that the surfaces occupied by the Photovoltaikkomponenten (7, 27) a repeated of the ship cover surface amounts to, and so far into one another to be pushed to be able that it a concise, the Schiffsbreite not exceeding pile to preferably form.

13. Production ship, according to requirement 1 and 8 to 10, by the fact characterized that at the ends of the stages (5, 6) laterally the ship (1) flotation chamber (11, 12) over an articulated lifting situation (28, 29) it is arranged.

14. Production ship, according to requirement 1 to 3, by the fact characterized that it exhibits a swiveling mechanism (32) for the tower (2) of the wind power machine (4).

15. Production ship, according to requirement 1 to 3, by the fact characterized that the tower (2) of the wind power machine (4) is telescope-like trained, whereby the lowest tubing element (35) to a large extent reaches is apportionable implemented the wind power machine rotor blades (36) up to the ship soil and.

16. Production ship, according to requirement 1, 2 and 8, by the fact characterized that the hull (1) exhibits one to a

large extent around ship-circulating attachment mechanism it a rip line (55).

17. Production ship, according to requirement 1 and 16, by the fact characterized that the anchor hurrying attachment mechanism rotating around the hull consists of a bar (13), which carries pin gearing-like pins (14) at its edge, against those on the ship side gear wheel-like roll bodies (15, 16) positively rests, which are stored in a handle (17), designed as rip line mounting plate, whereby at least one (16) is propelled driving device (18), arranged by one at the handle (17).

18. Production ship, according to requirement 1, 16 and 17, by the fact characterized that two such rotatable rip line attachment mechanisms (13-18) are arranged, whereby to everyone a rip line strand (57, 58) is fastened, which to a central anchorage basis (54) leads, or into a junction (56) united into a uniform rip line (55) changes this Ankerseilsträngе (57, 58).

19. Production ship, according to requirement 1, by the fact characterized that it exhibits a mechanism for automatic position observance on the sea.

20. Production ship, according to requirement 1 and 19, by it characterized that additionally to the marine propeller working in longitudinal direction transverseworking driving devices are arranged like tiltable ramjet propulsions or Voith-Schneider-propellers, and it an electronic receipt, tax and a controlling mean for the sow-suffer-led controlling of the driving devices exhibits.

21. Production ship, according to requirement 1, 2, 5, 6, 19 and 20, by the fact characterized that the wave additionally arranged of the Darrieus rotor is downward led by the hull and carries underneath the hull (1) a Voith-Schneider-propeller.

22. Production ship, according to requirement 1, by the fact characterized that their the generation of current and -dressing serving electrical components such as generators, solar modules, change or electric rectifiers are so trained that they supply the produced river to different consumer nets
tension and frequency-stable supply network for onboard operating equipment,
a load supply network for the procedure processes z. B. for the electrolysis, preferably a direct current net.

23. Production ship, according to requirement 1 and arbitrary further managing requirements by the fact characterized that it exhibits mechanisms
to the correction of the tower position and/or. Inclination during uneven wind load
to the avoidance of oscillation on swinging and resonance procedures as well as for oscillation damping.

24. Production ship, according to requirement 1 and 23, by the fact characterized that it is equipped with (Frahm) antiroll tanks, whereby also usable tank compartments are appropriately implemented in addition.

25. Production ship, according to requirement 1 and 23, by the fact characterized that it, or wind energy superstructures exhibits, with a system-firm storage a flywheel gyroscope.

26. Production ship, according to requirement 1, 23 and 25, by the fact characterized that the flywheel gyroscope is arranged as separate mechanism in the tower (2).

27. Production ship, according to requirement 1, 2 and 23, by it characterized that at rotary Basen of the wind power machine, or at one verdrehfest associated other basis, a rotor is arranged, their rotative moment (reduced to a uniform point) at least 40% over the sum of the rotative moments of the other, after current conditions of mechanical engineering and the wind power machine technology implemented rotary other elements of the same impulse path lies.

28. Production ship, according to requirement 1, 9, 10 and 13, by the fact characterized that the flotation chambers unloading laterally in the operating condition (11, 12) exhibit additional, in their volume and thus lift variable chambers (19, 20) whereby them its volume variation causative supplying and controlling mean are assigned.

29. Production ship, according to requirement 1, 2 and 28, by the fact characterized that the varüerbaren chambers (19, 20) consist of rubber bellows.

30. Production ship, according to requirement 1 and by the fact 28 characterized that the supplying and controlling mean exist out at least following components: one over a check valve (45) sucking in (r) (supplying) pump or compressor (39), a supplied an accumulator (28), with it, a supplied a control valve (39) with a four-way switching function, with it, in such a manner that over feeder lines (40, 41) the variable chambers (19, 20) are filled in a pre-determined way or emptied over exhaust lines (42, 43).

31. Production ship, according to requirement 1 and 28, by the fact characterized that the supplying and controlling mean exist out at least following components: (r) (m) in both connection directions operation and promotable (r) (n) pump or compressor (47), those or over feeder lines (46, 47) the variable chambers (19, 20) in a pre-determined way, (r) (m) the pressure and the amount of filling of this circle the determining (supplying) fills or empties pumping or compressor (49).

32. Production ship, according to requirement 1, 2, 3 and 23, by the fact characterized that
the wind power machine tower (2) on an upper tower carrier basis (76) sits, over the supporting and stroke elements (77-82) on a lower tower carrier basis (75), variable arranged between them, in their strength, pushes away,
it a supplying, a rule and control equipment for filling the supporting and stroke elements (77-82) exhibits.

33. Production ship, according to requirement 1 and 32, by the fact characterized that the supporting and stroke elements variable in their height (77, 78, 79, 81, 82) are wide rubber bellows.

34. Production ship, according to requirement 1, 23 and 30, by the fact characterized that
the supporting and stroke elements varüerbaren in their height (77, 81) oppositely the tower center distributed arranged are, like that that tower tilting motions are caused relative to the tower carrier (5) purposefully after all possible sides, whereby laterally one is arranged for wind direction (84) right-angled drag axis (Y-Y) a supporting and a pair of stroke elements (77, 81),

in wind direction (84) beyond the drag axis (X-X) on the wind-loaded side supporting and stroke elements (79, 80) are several times arranged, on which wind-TLA-constant side except a supporting and a stroke element (77), taking over the wind energy plant carriers, turned around a working supporting and stroke element (82) are arranged.

35. Production ship, according to requirement 1, 23, 32 and 34, by the fact characterized that the supporting and stroke elements (77-82) are regulated hydraulically or pneumatically in their height.

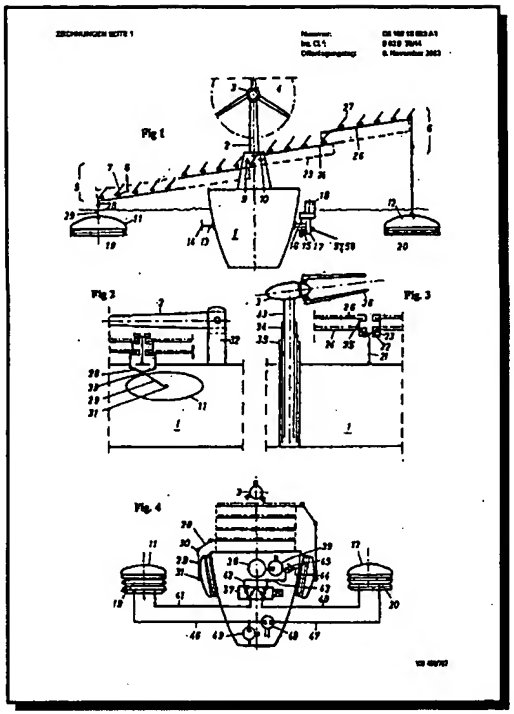
Fig. 1
Fig. 2
Fig. 3
Fig. 4

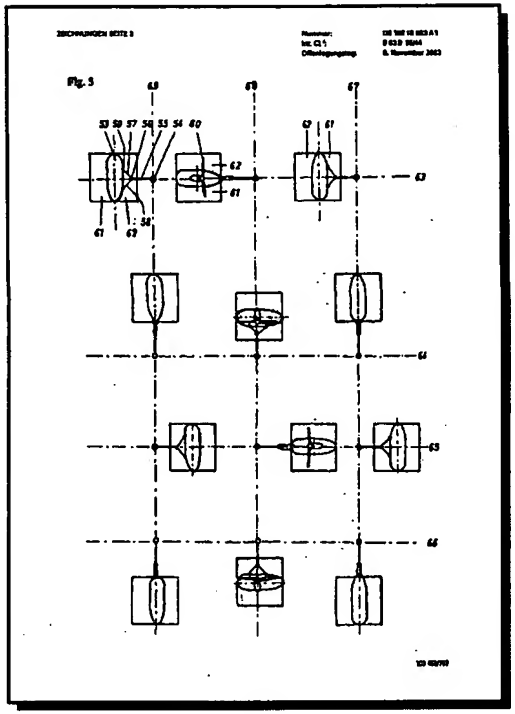
Fig. 5

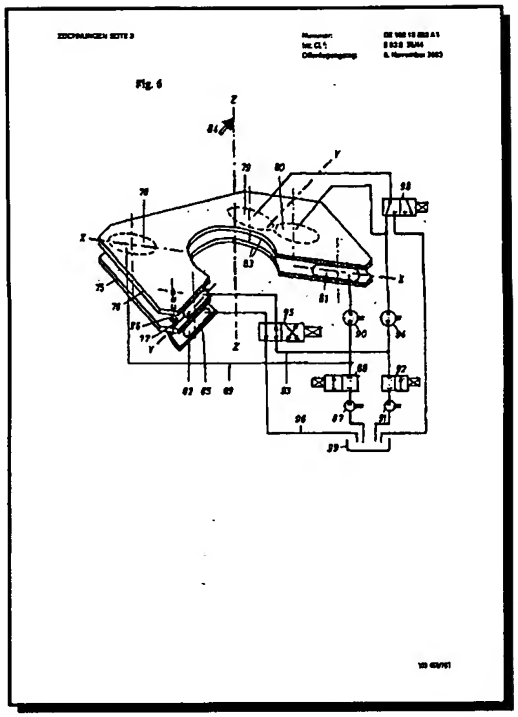
Fig. 6

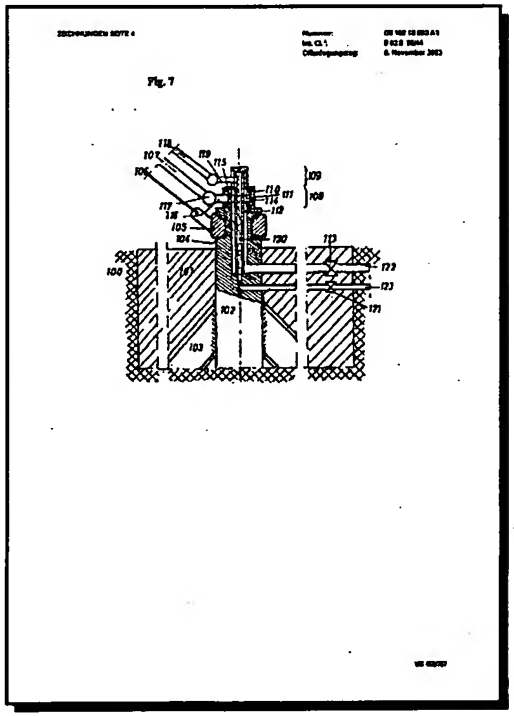
Fig. 7